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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/734,485	12/11/2003	James Rulon Young Rawson	134164	1608

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GENERAL ELECTRIC COMPANY
GLOBAL RESEARCH
PATENT DOCKET RM. BLDG. K1-4A59
NISKAYUNA, NY 12309

EXAMINER

FORTUNA, ANA M

ART UNIT	PAPER NUMBER
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1723

DATE MAILED: 10/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/734,485

Applicant(s)

RAWSON ET AL.

Examiner

Ana M. Fortuna

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 12/11/03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 2, 3, 4, 5, 6, 17, 19, 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Lien (US patent 6,004,464). Lien discloses the system including a tank for receiving spent brine, nanofiltration membranes in series for treating the spent brine from the tank, and a treated or regenerated spent brine tank receiving, which receives the permeate or treated spent brine (Fig. 1). Lien discloses the brine as collected from "a cation exchange resin, which removes polyvalent ions from aqueous streams, and is regenerated with a brine containing sodium chloride (column 1, lines 11-29). Lien further teaches reusing the collected (permeate) regenerated salt solution, e.g directing the salt solution back to the cation exchange resin (column 5, lines 22-27, and lines 49-51), and performing the process in a continuous or discontinuous mode (column 5, second paragraph). The cation exchange resin is an inherent part of the system.

Regarding claims 2-4 (see elements 11, 33(a, b), 55 and 70).

Regarding claims 5 and 6, (see column 5, lines 15-20, and 56-61, column 4, lines 3-16, column 8, claims 15-17).

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3. Claims 1-6, 17, 19, 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Brigano et al (US 5,254,257)(hereinafter Brigano). Brigano discloses the system including the ion exchange (cation exchange) resin column or tank connected to receive a brine regenerant, and to discharge the regenerant to tank to received the spent brine, the tank is connected to one or more nanofiltration membranes , fluid connection between the resin the spent brine tan and the membrane is inherent; the process of regeneration and recirculating back to the system and the system are disclosed in Brigano (elements 12, 48or 48 a, 48b, 52, 86, and 88 (connected to the cation exchange resin (not shown), Figs. 1-2, and column 3, lines 55-68, and column 4, and column 5, lines 1-14). Limitations of claims 4-6 are also disclosed (column 1, lines 1-60, and column 3, first paragraph).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 7-8, 14, 16, 17-20 rejected under 35 U.S.C. 103(a) as being unpatentable over Brigano et al (US 5,254,257) (hereinafter Brigano). Brigano, discussed in the paragraph above, teaches the regeneration of spent brine with nanofiltration, and recirculation of the regenerated brine, and the system to perform the process. The fluid mixer valve couple to the resin and to a water tank to dilute spent brine is not disclosed in Brigano. Regarding claims 1-8, and 17-20, Brigano teaches monitoring brine

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concentration and performing brine concentration adjustment when required (column 4, lines 47-65). It would have been obvious to one skilled in the art at the time the invention was made, alternatively dilute the brine, when the concentration of the recycled brine do not meet the required concentration for the ion exchange regeneration. It would have been obvious to one skilled in the art to perform the brine adjustment by either adding salt, as disclosed in Brigano, or by adding water to adjust the concentration depending on requirements indicated by the control (78) in Brigano's system. As claims 8, nanofiltration has been discussed above (element 48). As to claim 14, removing the need water, e.g. adjustment water by a pump, e.g. driving the water from any source to a valve or mixing point, it would have been obvious to one skilled in the art at the time the invention was made (note that Brigano discloses pumps and valves for moving fluids in the system, see Fig. 1). Regenerant containing sodium chloride is disclosed (column 1, lines 16-17).

6. Claims 9-13, 15, 18, 20 rejected under 35 U.S.C. 103(a) as being unpatentable over Brigano et al (US 5256,257) in view of Hassan (US 6,508,936) and Guillhen (US 4,806,244). Brigano, discussed above, fail to disclose combining the process with a reverse osmosis membrane for separating or concentrating the monovalent ions, and produce water as claimed in the present claims. Hassan teaches using reverse osmosis membranes to concentrate or separate monovalent ions from a permeate of a nanofiltration membrane, and the system, and the production of drinking water free of the monovalent ions (abstract, Fig. 2). It would have been obvious to one skilled in the art at the time the invention was made, wishing to concentrate a salt solution (e.g. a

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sodium chloride solution) to produce a purified water and concentrate salt, for any use, to use reverse osmosis membrane, as suggested in Hassan.

One skilled in the art at the time the invention was made would have been motivated to adjust the saturation concentration of the brine from the nanofiltration in Brigano's process by adding additional salt, as disclosed by Brinago, or alternatively by concentrating by removing salt, when the concentration is low, or by adding water if the concentration is high. Furthermore, using tap water, or water from the reverse osmosis membrane it would have been obvious to the skilled artisan, since the water is free of contaminants, and do not further alter the brine regenerant composition.

Guilhem is further cited as evidence of alternative use of nanofiltration or reverse osmosis membranes is regeneration of spent brine (column 3, lines 67-68, and column 4, lines 1-17, and last paragraph bridging with column 5, lines 1-2, and lines 14-67).

The later reference also teaches combining more than one or more membranes in the process (column 5, lines 36-42). It would have been obvious to one skilled in the art at the time the invention was made to combine alternatively nanofiltration and reverse osmosis membrane for separation and brine concentration.


Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Reference 5,932,106 is cited as teaching brine treatment with nanofiltration membrane and re use in ion exchange. Additional references also teach brine reuse..

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ana M. Fortuna whose telephone number is (571) 272-1141. The examiner can normally be reached on 9:30-6:00 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda L. Walker can be reached on (571) 272-1151. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Ana M Fortuna
Primary Examiner
Art Unit 1723

9/30/05

AF